

REGISTER

OF THE

TRUSTEES, OFFICERS AND STUDENTS

OF

THE LEHIGH UNIVERSITY,

SOUTH BETHLEHEM, PENN.,

FOR THE YEAR 1871-72.

WITH THE PLAN OF ORGANIZATION AND THE COURSE OF INSTRUCTION.

Homo Minister et Interpres Naturæ.

PUBLISHED BY ORDER OF THE BOARD OF TRUSTEES.



University Day

Thursday, June 22, 1871.

HALF-PAST TWO O'CLOCK, P. M.

ORDER OF EXERCISES.

MUSIC.

MARCHE DES TAMBOURS.....MICHAEL.
READING OF SCRIPTURE AND PRAYER.....Rt. Rev. Bishop Stevens,
President of the Board of Trustees.
THE RELIGIOUS AMENDMENT TO THE CONSTITUTION.....Frank Laurent Clerc. *CE*
Philadelphia, Pa.

MUSIC.

WALTZES—"ON THE FAIR BLUE DANUBE".....STRAUSS.
SERVICE.....Charles G. Weaver, Carlisle, Pa.

MUSIC.

SHEPHERDS' QUADRILLE.....STRAUSS.
MUSIC AND RELIGION.....Henry S. Drinker, Philadelphia, Pa. *EM.*

AWARD OF MEDALS AND SCHOLARSHIPS.

DIE LIEBE DES RUHMS.....Harvey L. Houskeeper, Bethlehem, Pa.

MUSIC.

OVERTURE TO "POET AND PEASANT".....SUPPÉ. *BA*
THE LAUGHING PHILOSOPHY.....William Hull McCarthy, New Haven, Conn.

MUSIC.

MEPHISTO GALOP.....LABITZKY.

CONFERRING DEGREES.

MUSIC.

KROLLS BALLKLÄNGE.....LUMBYE.

BENEDICTION.

MUSIC.

WEDDING MARCH.....KUBE.

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The Lehigh University.

UNDER THE AUSPICES OF THE PROTESTANT EPISCOPAL CHURCH.

ORIGIN.

During the year 1865, the Hon. Asa Packer, of Mauch Chunk, announced, unsolicited, to the Bishop of the Diocese, the Right Reverend William B. Stevens, D. D., LL. D., his intention to appropriate the sum of Five Hundred Thousand Dollars, and an eligible spot in South Bethlehem, containing fifty-six acres, (since enlarged by the donation of seven acres by Chas. Brodhead, Esq.,) for the purpose of founding an educational institution in the beautiful valley of the Lehigh, which should bear the name of THE LEHIGH UNIVERSITY. The Bishop was appointed President of the Board of Trustees.

DESIGN.

The purpose of the founder in making this munificent endowment was to provide the means for imparting to young men of the Valley, of the State, and of the Country, a complete professional education, which should not only supply their general wants, but also fit them to take an immediate and active part in the practical and professional duties of the time. The system determined upon proposes to discard only what has been proved to be useless in the former systems, and to introduce those important branches which have been heretofore more or less neglected in what purports to be a liberal education, and especially those industrial pursuits which tend to develop the resources of the country,—pursuits, the paramount claims and inter-relations of which natural science is daily displaying,—such as Engineering, Civil, Mechanical and Mining; Chemistry, Metallurgy, Architecture and Construction.

It was further believed that the course of four years, provided for in the old system as the same for all students, was not the best, as many were thus compelled to pursue studies for which, by nature, they were

not fitted, and which would be useless to them in their future professions. While the institution is intended to be of a polytechnic character, the preparatory instruction of two years is designed to fit a young man to pursue any one of the professional courses which he may select.

While such an institution promises to be of peculiar benefit to the Lehigh Valley, and to the numerous other districts of Pennsylvania which are rich in mineral resources of many kinds, its usefulness will not be thus limited; it is intended for the benefit of the whole country; the instruction which it affords will enable its graduates to play intelligent parts in exploring and developing the resources of all portions of the United States, and in applying the various modes of transporting and interchanging them.

THE SITE.

It would be difficult to find, anywhere in this country, a locality for educational purposes, which combines so many and such varied advantages as are concentrated on the site of The Lehigh University. Placed upon the gentle declivity of the Lehigh Mountain range in South Bethlehem, which, on that side, encloses the river valley, and in the midst of a noble park of forest trees, PACKER HALL, the principal University building, stands three hundred and ninety feet above tidewater, and has a magnificent, unobstructed view—over the Lehigh River and the town of Bethlehem—of the Blue Mountains, twenty miles distant.

FACILITIES OF COMMUNICATION.

The site is about half a mile from the Railroad Depot, which stands at the junction of the Lehigh Valley and North Pennsylvania Railroads, and which is on the same side of the Lehigh River. The facilities for reaching the institution are numerous and great. It is fifty-four miles from Philadelphia by the North Pennsylvania Railroad; eighty-seven miles from New York City, by the Lehigh Valley and New Jersey Central Railroads; and it communicates by the Lehigh Valley Road, in the other direction, with the rich and rapidly developing central portions of Pennsylvania. The Lehigh and Susquehanna Division of the New Jersey Central Railroad is on the left bank of the river from Easton to Scranton; and the Lehigh and Lackawanna Railroad, already in operation to Bath, and graded from that point to the Wind Gap, when completed to Stroudsburg, will there connect with the Delaware, Lackawanna and Western Railroad.

The health of Bethlehem is proverbial. The air is pure and extremely invigorating. The water in the University grounds and buildings is excellent, and free from limestone. The swiftly flowing Lehigh does not produce those ailments which are found on the banks of larger and more sluggish streams.

THE UNIVERSITY BUILDINGS.

Packer Hall, named in honor of the munificent founder, stands seven hundred feet back of Packer Avenue, the front limit of the University grounds; it presents an imposing façade of handsome stone. At the western extremity is a belfry tower, containing the President's room and the Archive room, at the eastern end is a large advanced wing, four stories high, in which are the lecture and recitation rooms. The central portion, eighty feet long, contains the chapel, library and cabinets. The entire length of Packer Hall is two hundred and thirteen feet. In the grounds, descending the hill in *echelon*, are erected the houses of the President and Professors, handsome buildings, which comport architecturally with the great Hall. Situated on Packer Avenue, towards the eastern extremity of the grounds, stands Christmas Hall, a large and commodious brick edifice, containing students' dormitories and a mess hall.

General Plan.

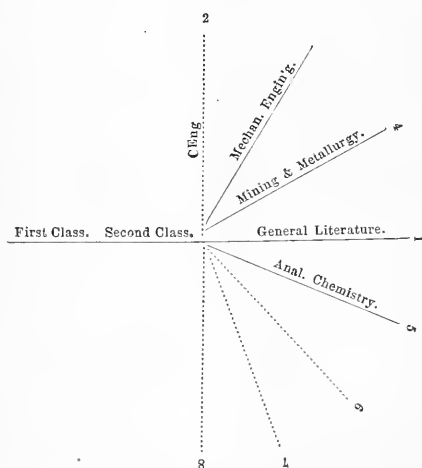
The courses and subjects of study are set forth and arranged in the following manner:

THE FIRST TWO YEARS.—These are devoted by all regular students to the study of those elementary branches in which every young man should be instructed, for whatever profession or business in life he may be intended, viz.; Mathematics, Languages, Elementary Physics, Chemistry, Drawing, History, Rhetoric, Logic, Declamation and Composition.

At the end of two years, having acquired this necessary knowledge, the student, following the bent of his own mind, and aided by his parents and professors, will be ready to select some special professional course, to which all his studies and efforts will be directed. To enable

him to do this there are several technical schools, which branch off from the end of the common course. In each, the term of study is two additional years, and the student, at his graduation in any one of them, receives a special degree. By this means, a young man is relieved from the overpowering and confusing study of those branches for which he has no taste, and pursues with cheerfulness the special course which he has selected, and for which he is suited by inclination and intelligence.

The students in the first two classes are called *First* and *Second Classmen*. Those in the schools are called *Junior* and *Senior Schoolmen*. A



simple diagram will show the relations of the classes to the schools.

The schools at present provided for are:

1. General Literature.
2. Civil Engineering.
3. Mechanical Engineering.
4. Mining and Metallurgy.
5. Analytical Chemistry.

This scheme will be expanded by the addition of other schools, as indicated by the dotted lines in the diagram. A few preliminary words will explain the nature of the schools.

1. THE SCHOOL OF GENERAL LITERATURE.—In this school, regular students may continue Latin and Greek, as *elective* studies. Rigorous attention will be paid to French and German Literature, Moral and Mental Philosophy, International Law, Civil Polity, Political Economy and Christian Evidences. There will be extended practice in composition in English, French and German. The earlier instruction in French and German being designed to enable the student to read the language, their further study in this school is intended to make him acquainted with literary and scientific works, and to give him thus a comparative view of the entire field of Modern Literature.

Students who complete the studies of this school will receive the degree of B. A., (Bachelor of Arts). This school corresponds, with certain important differences, to the course long established in our colleges; many of the studies, however, being of a higher order.

2. THE SCHOOL OF CIVIL ENGINEERING.—The general scope of this school comprises the higher branches of mechanics; surveying; topographical Engineering; the experimental examination, location, construction, and general management of canals, roads and railways: Geodesy; Hydrography; with so much of Mechanical Engineering as refers to bridges, canal locks and special constructions used in civil engineering; grading, paving, watering, draining, and lighting towns. Students in Civil Engineering will have their regular practice in the field, with the use of all necessary instruments, as a rigorous feature of the course.

To this school is also assigned instruction in Architecture and its applications, but with special stress upon those specific kinds of Architecture most used around us.

The graduate in this school will receive the degree of C. E., (Civil Engineer).

3. THE SCHOOL OF MECHANICAL ENGINEERING.—The studies of this school will comprise the applications of Mechanics to machinery, in the construction of hand, steam and air engines, stationary, locomotive and marine engines, mills of various kinds, furnaces, foundries rolling mills; the manner of casting and working in iron and other metals, and of making and using the implements employed in these works; the construction and use of various manufactories; agricultural implements and the machinery of the steading, water-works, gas-works, and warming and ventilating apparatus. Much attention will be paid to the drawing of models, and to the analysis and synthesis of machines. The proximity of numerous machine shops and foundries will enable the student to receive practical instruction in all branches of mechanical art, and visits to these will form an important feature in the school of Mechanical Engineering.

The graduate in this school will receive the degree of M. E., (Mechanical Engineer.)

4. THE SCHOOL OF MINING AND METALLURGY.—In the studies of this school are included Mineralogy and Geology; Metallurgy, with the modes of extracting all metals from ores; the methods of mining for various ores, with special instructions as to iron, coal, zinc, lead, copper, gold and silver. The aim will be to fit the student for immediate service in the rapidly developing mines of these metals in many parts of our country. The students in this school will be taken to the mines for ocular instruction.

The graduate in this school will receive the degree of E. M., (Engineer of Mines)

5. THE SCHOOL OF ANALYTICAL CHEMISTRY.—This school will comprise all the operations of chemical analysis, qualitative and quantitative; of inorganic and organic chemistry; the spectroscope; the blow-pipe; assays of every kind; practical problems; the analysis of minerals; mineralogy, geology, metallurgy. The student will have constant practice in the analytical laboratory, under the direction of the Professor.

The graduate in this school will receive the degree of A. C., (Analytical Chemist).

This general statement has been made, divested of details,—which are presented in the programme of studies,—in order to give a clear view of the system, and of the relation sustained between the regular preparatory instruction in the classes, and the special professional instruction in the schools.

In the school of Analytical Chemistry, the study of Physics and Mechanics will be continued from the class years. In the schools of Civil Engineering, Mechanical Engineering and Mining, the study of Physics, Mechanics and Chemistry will be continued from the class years, in such proportion as may be necessary in each. It will thus appear that some of the studies will be the same for two or more of the schools, especially in the Junior Year. In the Senior Year the separate and specific subjects of each school will be studied.

Programme of Studies.

In arranging a programme of studies to suit the needs of education in the present practical age, it was necessary to scrutinize the former systems, and to eliminate those studies which have been long demonstrating themselves to be useless, if not injurious; in no way strengthening the foundations of that knowledge which the student is to use during his life. It became also necessary, before such changes could be judiciously made, to go back and seek for the true relation which the elementary or foundation studies bear to each other and the system.

It is remarked in the first place, that *Mathematics, Chemistry, Physics, and Language*, form the basis of a practical education. These studies, while imparting practical knowledge, also secure that discipline of the mind which is essential to future progress.

1. The principles of *Mathematics* underlie the mechanical processes in nature and art. Too great prominence cannot, therefore, be given to this branch.

2. The study of *Chemistry* and *Physics*, forms the basis of all analysis of nature. Chemistry affords the knowledge of the elementary substances and their combinations, and opens and illustrates the subjects of mineralogy and metallurgy; and therefore great importance is given to Chemistry as an *elementary* branch of learning. These sciences are particularly attractive to young minds, by the number and variety of interesting experiments which are required to illustrate them.

3. It is hardly necessary to dwell upon the vital importance of Language as a means of study in all the arts, and of communication with men. A knowledge of the English Language, as to its structure, and its varied uses in the accurate expression of thought, cannot be too highly estimated. In order to secure this knowledge, Latin and Greek are studied in such a manner as to trace the English derivatives from those languages. French and German are taught with the same view, and further as a means of enabling the student to read the best treatises bearing upon his special studies in the University and his special pursuits hereafter. The student is also taught to speak these languages, that he may readily communicate with the numerous foreigners of every class, with whom he will certainly be brought into contact if he engage in industrial pursuits.

With these views, the following course of studies has been adopted, subject to such alterations and improvements as the progress of science may render necessary.

REQUIREMENTS FOR ADMISSION.

Applicants for admission into the First Class must be at least *sixteen* years of age, and must present testimonials of good moral character. They will be examined in the following subjects:

Mathematics.—Arithmetic complete; Davies' Bourdon's Algebra, through equations of the second degree. First four books of Legendre's or Chauvenet's Geometry.

English.—Correct spelling, to be determined by writing from dictation in idiomatic English. Mitchell's School Geography. Parker's English Grammar.

Latin.—The Elements of Latin Grammar, with the Rules of Syntax. Four books of Cæsar's Commentaries.

This examination will be rigorous, and no student will be permitted to enter in full standing who is deficient in these branches.

STUDIES OF THE FIRST CLASS.

FIRST TERM.

Mathematics.—Davies' Bourdon's Algebra completed.

English Studies.—Weber's Outlines of Universal History. Lectures on American History. Essays written extemporaneously under the eye of the Instructor. Declamations in the Chapel.

Latin.—Review of Latin Grammar and Cæsar's Commentaries—five books.

Greek.—Greek Grammar.

German.—Peissner's Grammar, with Lectures. Adler's Reader. Writing in German letters. Translation of German into English.

Geometrical Drawing.—Warren's Drafting Instruments and operations. Warren's Elementary Perspective.

SECOND TERM.

Mathematics.—Davies' Chauvenet's Geometry completed.—Chauvenet's Plane and Spherical Trigonometry and Mensuration: use of logarithmic tables.

Physics.—Chemical Physics; Text Book and Lectures.

Descriptive Geometry.—Warren's Elementary Projections.

Drawing.—The use of the pencil and pen in free hand drawing. Elementary Topographical Drawing.

English Studies.—Coppée's Elements of Logic. Compositions carefully prepared. Declamations in the Chapel.

Latin.—Arnold's Latin Prose Composition.

Greek.—Greek Grammar, and reading in Historical Selections.

German.—Adler's Reader, continued. Translation of English into German. Exercises in Conversation.

STUDIES OF THE SECOND CLASS.

FIRST TERM.

Mathematics.—Church's Analytical Geometry, Determinate and Indeterminate.—Chauvenet's Spherical Trigonometry.

Chemistry.—Lectures on the Principles of Chemistry. Inorganic: Fownes' Elementary Chemistry.

English Studies.—Coppée's Rhetoric. Lectures on the English Language. Compositions and Declamations.

Latin.—Cicero De Amicitia.

German.—Translation of English into German. Affinity of English and German. Exercises in Conversation.

French.—Translations from English into French. Résumé of the rules of Syntax. Copious exercises in French Idioms. Collot's French Grammar, with a course leading from the construction of easy sentences to composition and conversation. Chapsal's *Littérature Française*.

Drawing.—Maps of Farm Surveys. Pencil sketching.

Geodesy.—Chain and Compass Surveying:—theory and practice.

SECOND TERM.

Physics.—Heat, Electricity and Magnetism, Meteorology and Climatology.

Descriptive Geometry.—General Orthographic Projections; Shades and Shadows; Linear Perspective;—theory and plates.

Chemistry.—Lectures on the Principles of Chemistry. Organic Compounds: Fownes' Chemistry.

English Studies.—Constitution of the United States. Compositions and Declamations. Cutter's Physiology.

French.—Chapsal's *Littérature Française*, continued. French Compositions and a course to enable the students to read the scientific French works used in the different schools of the University. Declamations in French.

Topographical Drawing.—Colored Topography.

These studies complete the preparatory two years which fit a young man to enter one of the special professional schools.



The Special Schools.

The following is presented as the general programme of instruction in these schools :

REQUIREMENTS FOR ADMISSION.—Students who have passed successfully through the First and Second Classes, may be admitted into any one of the Schools. All other applicants for admission into one of the Schools must pass a satisfactory examination on the subjects studied in the first and second class years and must be at least eighteen years of age. Graduates of any College in good standing, will be received without an examination.

I.—SCHOOL OF GENERAL LITERATURE.

JUNIOR SCHOOLMEN.

Physics and Mechanics.—Acoustics, and Optics, and Mechanics.

Moral Philosophy.—Whewell's Elements of Morality.

History.—The History of the United States. References to Bancroft, Hildreth, Curtis's Constitutional History. Lectures on the Philosophy of History.

Languages.—Rhetorical studies in English. Declamation of original pieces. Themes. Colloquies. Lectures on English Literature. French readings from Molière, Corneille and other writers. German readings from Schiller :—Wallenstein, Don Carlos and Maria Stuart.

Drawing.—Landscape Painting, and Painting in Oil, at the option of the student.

SENIOR SCHOOLMEN.

Astronomy.—Loomis' Treatise on Descriptive Astronomy. Attendance in Observatory.

History.—English Constitutional History. The Student's History of France.

Languages.—French and German readings continued. Lectures on the comparative literature of the modern languages. References to Schlegel, and to Longfellow's Poets and Poetry of Europe.

Christian Evidences.—Lectures by the Professor.

Intellectual Philosophy.—Hamilton's Metaphysics.

Civil Polity.—Political Economy. International Law. References to Kent, Halleck and Woolsey. General Government and State Jurisdiction.

Rhetorical Studies.—Theses in English, French and German. Declaration of original pieces in these languages.

Optional Studies in the School of General Literature.—Greek and Latin may be continued, or Italian and Spanish may be studied, as the student may desire.

SCHOOL OF CIVIL ENGINEERING.

JUNIOR SCHOOLMEN.—First Term.

Mathematics.—Differential Calculus, Integral Calculus.

Moral Philosophy.—Whewell.

Physics.—Optics and Acoustics.

Mineralogy and Geology.—Dana's; with the use of the Museum.

French and German.—Throughout the term.

Geodesy.—Use and Adjustment of Field Instruments; Leveling; Triangulation; Topographical Surveying; Leveling with the Barometer; Plane Table Surveying.

Topographical Drawing.—Profiles; Plans of Trigonometrical Surveys; Contour Maps; Maps of Landscape Designs and Surveys.

SECOND TERM.

Mechanics.—Mathematical Theory of Motion; Science of Motion in general; Statics; Dynamics and Equilibrium of Bodies; Theory of Centre of Gravity and Movement of Inertia and Statics of Fluids.

Stereotomy.—Cinematics; Elements of Machine Drawing; Drawings of Structures; Working Drawings.

Geology.—Technical Geology.

Geodesy.—Town Surveying; Hydrography; Mine Surveying.

French and German.—Throughout the Term.

Topographical Drawing.—Hydrographical Charts; Plans and Profiles of Mines; Town Maps.

SENIOR SCHOOLMEN.—First Term.

Applied Mechanics.—Elasticity and Strength of Materials including forms of uniform Strength; Stability of Structures; Theory of the Arch; Elementary Machines; Practical Hydraulics.

Moral Philosophy.—Whewell.

Astronomy.—Loomis' Descriptive and Practical Astronomy.

French and German.—Throughout the Term.

Stereotomy.—Stone Cutting; Working Drawings.

Geodesy.—Theory of the Reconnoissance; Preliminary and Location Surveys of Roads, Railroads, Canals, &c., together with Preliminary Field Practice in Staking out Curves, Sidings, &c.

SECOND TERM.

Applied Mechanics.—Theory of Trussed Frames; General Theory of Machines.

Constructions.—Materials of Structures; Dressing and Preservation of Materials; Foundations; Roofs, Bridges and Culverts. Construction of Roads, Railroads, Canals and Tunnels; Earth and Rock Work in general; Harbor and River Improvements; Farm and Town Drainage; Collection and Distribution of Water; Warming and Ventilation; Estimates of Quantities and Cost; Specifications; Designs for, and Reviews of Special Structures.

Astronomy.—Practical Astronomy.

Chemistry.—Chemistry of Building Materials. Lectures.

French and German.—Throughout the Term.

Geodesy.—Field Work of the Preliminary Survey; Comparison of Lines; Field Work of the Location; Staking out Property Lines and Cross Sectioning; Setting Grade Stakes; Special Practice in Setting Lines and Staking out for Construction.

Topographical Drawing.—Plan and Profile of Preliminary Survey; Map and Profile of Location; Property Maps; Drawings illustrative of Final Estimates.

2.—SCHOOL OF MECHANICAL ENGINEERING.

JUNIOR SCHOOLMEN.—First Term.

Mathematics.—Same as in School of Civil Engineering.

Physics. “ “ “

Moral Philosophy.—Whewell.

Mineralogy and Geology.—As in School of Civil Engineering, with special extension of the former.

Metallurgy. General Metallurgy.—As in School of Mining Engineering.

Stereotomy.—Warren's Machine Drawing;—Theory and Plates; Sketches and Working Drawings of Parts of Machinery.

French and German.—Throughout the Term.

Practical Mechanism.—Clinical Lectures in the Work-shop.—Hand Tools and Appliances.

SECOND TERM.

Mechanics.—As in Civil Engineering.

Mineralogy and Geology.—Economic Geology.

Metallurgy.—Special Metallurgy.—As in School of Mining Engineering.

Stereotomy.—Cinematics ; Sketches of Complete Machines ; Finished and Working Drawings of Simple Machines.

French and German.—Throughout the Term.

Practical Mechanism.—Clinical Lectures in the Work-shop.—Machine Tools ; Planing ; Turning, &c.

SENIOR SCHOOLMEN.—First Term.

Applied Mechanics.—As in Civil Engineering.

Astronomy.—Descriptive Astronomy ; Attendance in the Observatory.

Machine Drawing.—Finished and Working Plans of Castings ; Designs for Castings.

French and German.—Throughout the Term.

Practical Mechanism.—Lectures on Forging, Riveting, Pattern Making and Moulding ;—with Practice in the Work-shop.

SECOND TERM.

Machines.—Hydraulic Engines ; Steam Engines ; Air Engines ; Boilers, their Construction, Strength and Safety. Construction of Furnaces ; Foundry, Machine-shop, Rolling Mill and Bessemer Plants ; Special Machines ; Designs for and Reviews of Special Machines.

Chemistry.—Applied to the Arts. Lectures.

French and German.—Throughout the Term.

Practical Mechanism.—Setting up and Fitting ; with Practice in the Work-shop.

Machine Drawing.—Finished and Working Drawings of Special Machines.

SCHOOL OF MINING AND METALLURGY.

JUNIOR SCHOOLMEN.

Mathematics and Mechanics.—Same as in School of Civil Engineering.

Moral Philosophy.—Whewell.

Physics.—Same as in School of Civil Engineering.

Chemistry.—Work in Laboratory ; Qualitative and Quantitative Analysis.

Mining.—Modes of occurrence of the useful minerals.

Rules for research of mineral deposits and examination of mining properties. Boring. Artesian wells. Oil wells.

Miners' tools.—Blasting, drilling and coal cutting machines, tunneling and sinking shafts.

Timbering and walling of tunnels and shafts ; tubbing of shafts ; construction of dams, &c.

Methods of Exploitation.

Open air mining. Hydraulic mining. Ore mining in veins, beds and irregular deposits. Coal mining. Salt Mining. Examples from different mining districts.

Underground Transportation. Hoisting.—Engines, ropes, cages, cars, safety catches, man engines, &c. Visits to neighboring coal, iron and zinc mines.

Geodesy.—Use and Adjustment of Field Instruments; Leveling; Triangulation; Topographical Surveying; Leveling with the Barometer; Mine Surveying.

Metallurgy.—General Metallurgy.

Classification of Metallurgical processes. Furnaces. Classification and modes of construction. Natural and artificial refractory building materials. Manufacture of fire bricks, crucibles, retorts, &c.

Nature of Combustion, and conditions favorable to it.

Draft, Natural and Artificial.—Chimneys, fans, blowing engines, &c. Smoke consuming processes.

Gas furnaces.—Siemen's Regenerating Furnace.

Fuels.—Calorific power; methods of computing quantity and intensity of heat. Coal, lignite, peat, wood. Manufacture of charcoal, coke, and patent fuel. Drying peat and wood.

Metallurgy of Iron.

Physical and Pyrochemical qualities of Iron. Description of Iron Ores. Preparation of Ores for Blast Furnaces.

Blast Furnaces.—Methods of working. Influence of temperature and pressure of blast, form of furnace, &c. Chemical Reactions in the Blast Furnace.—Gases, slags, &c. Hot Blast Stoves, Hoists, Charging Apparatus, &c.

Casting in iron.—Preparation of moulds, remelting in cupola and reverberatory furnaces.

Manufacture of Wrought Iron from Pig Iron.—Forges, puddling, and reheating furnaces, hammers, rolling mills, &c.

Manufacture of Wrought Iron directly from the Ore.—Bloomeries, &c.

Manufacture of Steel directly from the Ore.—Manufacture of Steel from cast iron in forges and puddling furnaces. Cementation. Casting Steel. Bessemer's process, &c.

Mineralogy.—Crystallography. Exercises in drawing crystals and determining crystalline forms in models and minerals. Descriptive

Mineralogy. Exercises in determining minerals. Practical instruction in the use of the blowpipe. Access to the Mineralogical Cabinet.

French and German.—Throughout the Year.

Drawing.—Problems in Descriptive Geometry. Crystals. Plans and sections of mines and mining machinery, furnaces, apparatus, and machinery of *Smelting Works*. Plans of Trigonometrical Surveys; Contour Maps; Geological Charts.

The students in this department will be required to execute plans or projects for the establishment and working of Mines and Smelting works, under given conditions, with drawings and written memoirs.

SENIOR SCHOOLMEN.

Applied Mechanics.—As in the School of Civil Engineering.

Christian Evidences.—Lectures.

French and German.—Throughout the Year.

Drawing.—Plans, Sections, and Elevations of mines, furnaces, machinery, &c., as in the Junior year.

Astronomy.—Same as in School of General Literature.

Mining.—Pumps and Pumping machinery.

Ventilation.—Discussion of its laws. Nature of gases found in mines. Natural ventilation; Artificial ventilation; furnaces; Mechanical ventilators; Distribution of air in mines; Measurement of ventilation and work done by ventilators.

Lighting of Mines.—Safety lamps, &c.

Accidents in Mines.—Precautionary measures.

Fires in Mines.—Means of preventing and extinguishing them.

Mechanical Preparation of Ores.—Stamps, mills, screens, jigging machines, percussion tables, &c.

Washing and dressing of Coal. Coal Breakers, &c.

Metallurgy.—Metallurgy of Zinc. Pyrochemical properties of Zinc. Ores of Zinc. English, Belgian and Silesian processes of extraction. Manufacture of Oxyde.

Tin.—Properties and ores. Preparation of ores. German and Cornish methods of extraction.

Copper.—Properties and ores. Reduction of oxydized ores. Swedish, English and mixed methods of treatment of sulphurous ores. Methods of extraction from poor ores by the wet way.

Lead.—Properties and ores. American, Carinthian, English, and Belgian processes of extracting lead “by reaction.” Processes of reduc-

tion of roasted ores in blast furnaces; processes by precipitation: mixed processes. Extraction of silver from lead; Pattinson's and Parkes' processes; German and English cupellation.

Silver.—Properties and ores. American and European Amalgamation; Amalgamating pans. Smelting with lead. Methods of extraction by wet way.

Gold.—Properties and ores. Washing. Amalgamation Smelting with lead. Extraction by the wet way. Separation from silver.

Metallurgy of Platinum, Aluminium, Mercury, Arsenic, Antimony, Bismuth, Nickel and Cobalt.

Chemistry.—Quantitative Analysis; Volumetric Analysis of Ores; Dry Assaying.

Geology.—Dana's; Physical Geography; Lithology, with practical exercises; Stratigraphical and Dynamic Geology.

Plans for establishment of Mines and Smelting works, as in Junior year.

5. SCHOOL OF ANALYTICAL CHEMISTRY.

JUNIOR SCHOOLMEN.

Mechanics.—Weisbach.

Physics.—Same as in School of General Literature.

Moral Philosophy.—Whewell.

Geology.—The same Course as in the School of Mining.

Mineralogy.—The same Course as in the School of Mining.

French and German.—Throughout the Year.

CHEMISTRY.

FIRST TERM.—Qualitative Analysis.—Fresenius. Blowpipe Analysis. Chemical Preparations.—Wittstein. General Chemistry.—Miller's Inorganic. Stoichiometry.—Cooke's Problems.

SECOND TERM.—Toxicology.—Otto. Assaying.—Mitchell. Quantitative Analysis.—Fresenius. General Chemistry.—Miller's Organic.

SENIOR SCHOOLMEN.

Astronomy.—The same as in School of General Literature.

Christian Evidences.—Lectures by the Professor.

French and German.—Throughout the Year.

CHEMISTRY.

FIRST TERM.—Quantitative Analysis.—Fresenius. Organic Analysis.—Fresenius. Volumetric Analysis.—Mohr. Determination of Vapor Densities.

SECOND TERM.—Gas Analysis.—Bunsen. Agricultural Chemistry.—Cauldwell. Medical Chemistry.—Bowman. Chemistry applied to the Arts.—Lectures. Preparation of Thesis.

REMARK.—Students are charged for the chemicals and apparatus consumed. If the student is moderately careful, this expense need not exceed \$30 per year.

The University Year.

The University Year is divided into two terms: the first term opens on the first of September, and ends on the first of February. The second term opens on the third of February, and ends on University day. There is a short Christmas vacation, beginning on the twenty-second of December, and ending on the third of January; and a short Easter vacation, from the Thursday before Easter to the Monday after Easter Monday. From the twenty-fifth of June to the first of September shall be the long summer vacation. All exercises shall also be suspended during the hours of Divine service, on Ash Wednesday and on Thanksgiving Day. Except on special occasions, there shall be no other vacations during the year.

DAILY EXERCISES.—The bell will be rung daily at twenty minutes before nine o'clock, A.M. All the students will assemble at a quarter before nine, to attend the religious exercises, which will be conducted by the President, or in his absence by one of the Professors in the order of seniority. The arrangement of seats is in alphabetical order, and every student shall retain his seat during the term, unless he receive special permission from the President to change it. All absentees are noted by the University Instructors.

CHAPEL EXERCISES.—The exercises in the chapel consist of Scripture reading, sacred music and prayers, after which there shall be declamation of selected pieces (daily, except Sunday,) by the students in regular routine. This will cause the first hour of recitation or lecture to begin at about nine o'clock.

RECITATION HOURS.—To all lectures each class goes in a body. For purposes of recitation, the classes, according to the number of students in each, are divided into two or more sections, to secure the special attention of the instructor to the daily exercise of each student.

As soon as the students are dismissed from chapel, they proceed in classes or in sections to their recitation rooms, according to arranged roster.

Greek is discontinued at the end of the first year; the hours thus relieved are given to German, as are also some hours taken from Latin and French. The arrangement of the roster gives four hours of University exercises—recitations, lectures and drawing—daily to each student. There is but one hour of recitation on Saturday—from nine to ten.

STUDY HOURS.—Study hours, announced by the ringing of the bell, will begin at seven, P. M., during the first term; and at half past seven, P. M., during the second term. During this time, students are required to be in their rooms, unless they receive permission of absence from the President, and they will not leave their rooms again during the night.

SUNDAY EXERCISES.—Every student is required to attend Divine Service on Sunday morning. The bell will be rung at ten o'clock, A. M., when the students will proceed to the Church of the Nativity, where free seats are provided for them. Any student who presents the written request of his parent that he may attend another place of worship, will receive special permission from the President to do so. Sunday must be observed by a quiet and orderly demeanor.

. It is to be noted that while the University is, by this action of the Founder and the Board of Trustees, placed under the auspices of the Protestant Episcopal Church, no undue influence is brought to bear upon the students contrary to their own religious predilections or the expressed wishes of their parents.

Admission of Students.

Application for admission into the University should be made to the President, from whom all information may be obtained.

REGULAR STUDENTS—All applicants for regular standing in the classes or schools, must be prepared to pass an examination according to the programme of studies just given. From this it will be seen that

a student may be admitted at any time, if able to pass a satisfactory examination in the studies already pursued by his class.

PARTIAL STUDENTS.—Any young man of good moral character, and of the required age, may enter as a partial student, selecting such studies as he pleases, with the sanction of the President.

CONDITIONAL STUDENTS.—Any young man who is partially, but not thoroughly, prepared to enter in full standing in either class, *may be admitted conditionally to make up his deficiencies by extra study under the care of a Professor or Instructor.* When they are made up he will be received into full standing in his class.

PREPARATORY CLASS.—Students, who are at least fifteen years of age, are received, in a preparatory class, and fitted for admittance into the next regular class.

GRADUATES OF COLLEGES, in good standing, will be received into any of the Schools without a preliminary examination. But in no other case shall a student be admitted without passing an examination on the studies which have been pursued by the class.

Any person or corporation may, by permission of the Board of Trustees, endow a scholarship by the payment of——dollars into the Treasury of the University; the interest of which shall be used in defraying the expenses of the holder. The scholarship shall bear the name of the person or corporation endowing it, who shall also nominate a student, and such student shall be appointed to it, provided he pass his examination, and his admission and residence are sanctioned by the President.

The arrangements for *partial students* have also special reference to young men who, from the force of circumstances, have not disposition, time, or means for a full course, but who desire to gain in a limited time, as much technical and practical knowledge as they can in a special department. Among these are many who, while obliged to labor daily, can only devote a small portion of their time to study. Such are invited to come and learn what they can, and they will have such inducements presented to a continuance and increase of their studies, as their earnestness, industry, and proficiency may warrant.

MODES OF INSTRUCTION.—The instruction, in all parts of the University course is, principally by text-books with supplementary lectures. The use of text books enables the student to revise his lessons by reference to his books. All supplementary instructions will be written by the student in his note-book, or problem book, which will be produced at review and examination.

LIBRARY.—The Library of the University shall be for the use of the members of the Board of Trustees, the President, Professors, and all officers, and the students of the University. It shall be open every day, except Saturday and Sunday, from ten to twelve, A. M., and from three to five, P. M. It is designed also as a reading-room for the students in the hours between their recitations. Students whose rooms are at a distance from the University may thus have a commodious place for study.

A Librarian, appointed by the Trustees, shall have charge of the Library; and remain in it during the hours mentioned; he will be responsible for its order; and shall make an annual report to the President of its condition, accompanied with a list of books procured during the year, whether by donation or purchase; if the latter, from whom purchased, and at what prices. He shall keep a manuscript catalogue, in which the books shall be twice arranged: Alphabetically, and according to subjects.

Books of general reference, which shall be separately catalogued, such as atlases, encyclopædias, dictionaries, catalogues, and other books of great rarity or value, shall not be taken from the Library without the written permission of the President.

Persons not connected with the University may, under certain restrictions, obtain permission to consult books in the Library.

Students may take out two books at a time, to be retained not longer than four weeks. No book shall be lent by a student; and all books must be returned before the end of the term. Students desiring to consult books will ask the Librarian for them, and not take them from the shelves without his permission.

There shall be no loud talking or disorder of any kind in the Library. All damages to books shall be assessed by the Librarian, under an established tariff. All books lost or destroyed will be replaced at the expense of the loser or destroyer.

Observatory.

By the liberality of Robert H. Sayre, Esq., one of the trustees of the University, an Astronomical Observatory has been erected on the University grounds and placed under the care of the Professor of Mathematics and Astronomy, for instruction of students in Practical Astronomy.

The Observatory contains an Equatorial, by Alvan Clark, of six inches clear aperture, and of eight feet focus; a Zenith Sector, by Blunt; a Superior Astronomical Clock, by William Bond & Sons; a Meridian Circle and a Prismatic Sextant, by Pistor and Martins.

The Lehigh Junto.

A literary society bearing the name of the "Lehigh Junto" has been organized by the students and meets weekly. Students are admitted by election. The members of the Board of Trustees and the Faculty are honorary members of the Junto. Besides the weekly meetings, there are public exercises of the society on special occasions.

EXPENSES.

BOARDING.—A limited number of rooms are provided in the University buildings, to be occupied by students, and arrangements have been made for a mess-hall, where any or all may board in messes of about thirty each; but students may board and lodge in any part of the town, provided the houses they select meet the approval of the President.

The rooms in the University buildings are rent free; but each student provides his own furniture. The board in the mess-hall is furnished at as low rate as possible.

Through the generosity of the Founder, and by a resolution of the Trustees, passed in July, 1871, tuition was declared to be *Free* in all branches and classes. The following are the expenses approximately stated:

Board (40 weeks at about \$5).....	\$200
Books.....	20
Washing.....	25
	<hr/>
	\$245

Books, materials, paper, pencils, chemical materials used in the analytical laboratory and instruments are furnished by the student.

DIPLOMAS AND CERTIFICATES.—The Diploma is given only to those who have passed the regular course in the Classes and one of the Schools. For all partial courses, a certificate is given of what the student has accomplished.

The fee for the diploma on graduation in any one of the Schools is \$10, payable before receiving it.

GRADUATING ESSAYS.

Every student, in each of the Schools, will be required to present a written essay upon some topic connected with his special school, as a necessary portion of the exercises for his final examination for a diploma. These essays shall be accompanied by drawings and diagrams, when the subject needs such illustration. The originals will be kept by the University, as a part of the student's record, for future reference; but a copy may be retained by the student, and be published, permission being first obtained from the President.

UNIVERSITY DAY AND EXHIBITIONS.

The day following the close of the Annual Examination shall be known as **UNIVERSITY DAY**. Upon this day the "Annual Exhibition of graduates" shall take place in the University Chapel, in the presence of the Trustees, Faculty, and invited guests. The exercises shall consist of orations by Junior and Senior schoolmen, and an address to the students by the President or some other member of the Faculty. Every student must perform the duty assigned to him, unless excused by the President.

On some other day, annually appointed, the University Oration will be pronounced by some distinguished person invited to do so.

The University Sermon will be preached on the Sunday before University day, under the direction of the President and the Reverend Professor of Christian Evidences.

PHYSICAL EXERCISE.—A large and complete Gymnasium will be provided, which will be open to all students who subscribe a small sum to keep it in proper repair.

An unobstructed stretch of water for several miles above the town of Bethlehem and below affords excellent opportunities for the manly and admirable exercise of the oar.

RESIDENT GRADUATES.

A limited number of graduates, who desire to pursue their studies under the general direction of the Faculty, may be allowed the use of the Library, and may attend the lectures in any of the departments, during a term of three years, free of expense. Although not bound by University hours, they will be required to obey the directions of the President, and of the Professors in reference to their departments; will board and lodge only in places sanctioned by the President, and will have their names placed upon the Annual Register.

PRIZE TO BE AWARDED IN 1872.

A gold medal for the best essay in the Second Class. Subject: "*The Lehigh Valley*."

AWARD ON "UNIVERSITY DAY," JUNE 22, 1871.

The gold medal for the best essay on "*The Lehigh Valley*," in the Second Class, presented by Charles Brodhead, Esq., was awarded to J. P. Stuart Laurance.

THE UNIVERSITY SERMON

Was preached in the Church of the Nativity, on Sunday, June 18th, by the Rev. Henry C. Potter, D. D., of New York City.



STUDENTS.

FIRST CLASS.

ENTERED SEPTEMBER 1, 1871.

WILLIAM B. BALDY,	. . .	Danville.
CHARLES J. BECHDOLT,	. . .	South Bethlehem.
CLEMENT BIDDLE,	. . .	Philadelphia.
S. MASON BINES,	. . .	Pottsville.
MARSH D. BINGHAM,	. . .	Pittsburg.
GEORGE H. CAMPBELL,	. . .	Woodbury, N. J.
JOHN C. CARTER,	. . .	Lancaster.
JOHN C. CLARKE,	. . .	New York City.
J. FORD DORRANCE,	. . .	Wilkes Barre.
JOHN H. EVANS,	. . .	Allentown.
JOHN G. HALBACH,	. . .	Catasauqua.
GEORGE W. HALDEMAN,	. . .	Chickie's Furnace.
JOHN H. W. HAWKINS,	. . .	Chambersburg.
CHARLES H. HOXWORTH,	. . .	Allentown.
ASA JONES,	. . .	Flemington, N. J.
W. ARTHUR LATHROP,	. . .	Springville.
EDWARD S. LAWRENCE,	. . .	Reeseville.
WILLIAM G. McMILLAN,	. . .	South Bethlehem.
ARTHUR E. MEAKER,	. . .	Hawleytown, N. Y.
JOSEPH MORRISON,	. . .	Glendon.
SAMUEL D. MOTT,	. . .	Milford.
J. WOLFORD MUMPER,	. . .	South Bethlehem.
FRANK W. PARSONS,	. . .	Philadelphia.
JAMES POLLOCK,	. . .	Pottsville.
JOHN E. RATHBUN,	. . .	Treverton.
GEORGE B. REYNOLDS,	. . .	Shawnee, Pa.
HENRY RICHARDS,	. . .	Dover, N. J.
CHARLES S. RUNK,	. . .	Allentown.
FRED. M. SAYRE,	. . .	Scranton.
GEORGE C. SCOTT,	. . .	Catawissa, Pa.
E. WARREN STURDEVANT,	. . .	Wilkes Barre.
FRANK A. WATKINS,	. . .	Philadelphia.
WILLIAM WHITE,	. . .	Butler.
CARL F. ZOGBAUM,	. . .	Philadelphia.

SECOND CLASS.

ENTERED SEPTEMBER 1, 1870.

CHARLES S. BEARDSLEY, . . .	Lock Haven.
JAMES E. BOWDOIN, . . .	Baltimore, Md.
WILLIAM C. CROSS, . . .	Milford, Pa.
WILLIAM D. HARTSHORNE, . . .	Brighton, Md.
OLIVER M. JENKS, . . .	Philadelphia.
RODOLPHUS KENT, JR., . . .	Gwynedd.
THOMAS MERRITT, . . .	Morristown, N. J.
JULIUS P. MEYER, . . .	Fond du Lac, Wis.
ROBERT MITCHELL, . . .	Lebanon.
W. MARSHALL REES, . . .	Stroudsburg.
CHARLES ROWE, . . .	South Bethlehem.
G. HERBERT STEARNS, . . .	Elizabeth, N. J.
CLEVELAND S. STILLWELL, . . .	Staten Island.
LEWIS M. STRATTON, . . .	Great Bend.
SMITH W. WILSON, . . .	Clearfield.

COMPETITION SCHOLARSHIP AWARDED TO

JULIUS P. MEYER.

JUNIOR SCHOOLMEN.

ENTERED SEPTEMBER 1, 1869.

SCHOOL OF GENERAL LITERATURE.

JAMES E. BOWDOIN,* . . .	Baltimore, Md.
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SCHOOL OF CIVIL ENGINEERING.

ROBERT B. CLAXTON, . . .	Philadelphia.
GEORGE B. THOMAS, . . .	Media.

SCHOOL OF MECHANICAL ENGINEERING.

J. P. STUART LAWRENCE, . . .	Reeseville.
WALLACE M. SCUDDER, . . .	Trenton, N. J.

* Partial student.

SCHOOL OF ANALYTICAL CHEMISTRY.

JOSEPH B. BAKER,	Philadelphia.
WASHINGTON H. BAKER,	"
D. A. BOWMAN,	Mahanoy City.
ASA JONES,*	Flemington, N. J.
JAMES ORRICK,	Cumberland, Md.

SENIOR SCHOOLMEN.

ENTERED SEPTEMBER 1, 1868.

SCHOOL OF GENERAL LITERATURE,

HARVEY S. HOUSKEEPER, . . .	South Bethlehem.
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SCHOOL OF CIVIL ENGINEERING.

GEORGE P. BLAND,	Philadelphia.
DANIEL P. BRUNER,	Columbia.
HARRY ST. LEGER COPPÉE, . . .	South Bethlehem.
LENTZ EDMUND KLOTZ,	Mauch Chunk.
JAMES S. POLHEMUS,	Astoria, L. I.
HENRY D. SCUDDER,	Trenton, N. J.

SCHOOL OF MECHANICAL ENGINEERING

RAYMUNDO FLORESTA DE MIRANDA, . . .	Pará, Brazil.
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SCHOOL OF ANALYTICAL CHEMISTRY.

F. C. DEGENHARDT,	Brooklyn, L. I.
GEO. S. EYSTER, A. B. (Penn Coll.), . . .	Gettysburg.
OSCAR M. LANCE,	Plymouth.
HILDEBRANDO BARJ. DE MIRANDA, . . .	Pará, Brazil.
GEORGE P. STEELE,	Wilkes Barre.

COMPETITION SCHOLARSHIP AWARDED TO GEORGE PIERREPONT BLAND.

PREPARATORY CLASS.

FRANK C. ANGLE,	Danville.
GEO. O. BACHMAN,	Freemansburg.
WILLIAM H. BANKS,	San Antonio, Texas.

* Partial student.

SAMUEL S. BIGLER,	Harrisburg.
OLIVER C. BOYD,	Cornwall.
HIRAM BOYER,	Bethlehem.
JAMES R. BUTZ,	Easton.
JOHN CALVERT,	Philadelphia.
JAMES D. CARSON,	Toledo, Ohio.
HARRY S. CAVANAUGH,	Easton.
JAMES B. CORYELL,	Williamsport.
NICHOLAS CRILLY,	Allentown.
THOMAS DINAN,	South Bethlehem.
EDWARD M. EARLE,	Catasauqua.
GEORGE EDLER,	New York City.
ALEXANDER ELLIOT,	Dover, N. J.
THOMAS N. FREDERICK,	Catasauqua.
HORATIO H. GATES,	New York City.
CURWIN H. GRAFF,	South Bethlehem.
ROBERT N. GETTY,	Charleston, S. C.
WILMOT S. GETTY,	" "
ALFRED F. HANNA,	Lykens.
WM. HENDERSON,	Harrisburg,
JOHN H. HOSIE,	Tamaqua.
FRANK JOHNSON,	Bethlehem.
VICTOR J. JONES,	"
GORDON H. KING,	South Bethlehem.
GEORGE KRAM,	"
JOSEPH N. KUHN,	Greensburg.
JOHN M. LEIGHT,	Jersey City Heights, N. J.
EDWARD M. MASON,	Towanda.
T. BARKER MAYNADIER,	Washington City, D. C.
JAMES B. MCJUNKIN,	Butler.
CHARLES J. MEAD,	Hyde Park, N. Y.
C. A. MORRISON,	Glendon.
JOHN NEVINS,	Catasauqua.
THOMAS REILLY,	South Bethlehem.
JOHN D. SELLS,	Atlanta, Ga.
JAMES SHERIDAN,	" "
WILLIAM D. SMYLLIE,	Philadelphia.
STEPHEN TAGGART,	Hazleton.
F. MILTON TERRY,	Easton.
FRANK N. TURNER,	Port Carbon.
HARRY G. UHLER,	Easton.
REUBEN R. WEIDNER,	Seidersville.
J. PARKER WHITE,	Williamsport.
WM. E. WILLIAMS,	Bethlehem.
WM. H. WINTERS,	Harrisburg.
WM. H. YOUNG,	South Easton.

Calendar.

FIRST TERM.

Opened Friday, September 1, 1871.

Christmas Vacation begins at 12 o'clock, on Friday, December 22, 1871, and ends at 12 o'clock on Thursday, January 4, 1872.

First term ends on Thursday, February 1, 1872.

SECOND TERM.

Opens Saturday, February 3, 1872.

Easter Vacation begins on Thursday, March 28, and ends on Tuesday, April 9, 1872.

The Annual Examination opens on Friday, June 7, and ends on Wednesday, June 19, 1872.

"UNIVERSITY DAY."—Thursday, June 20, 1872.

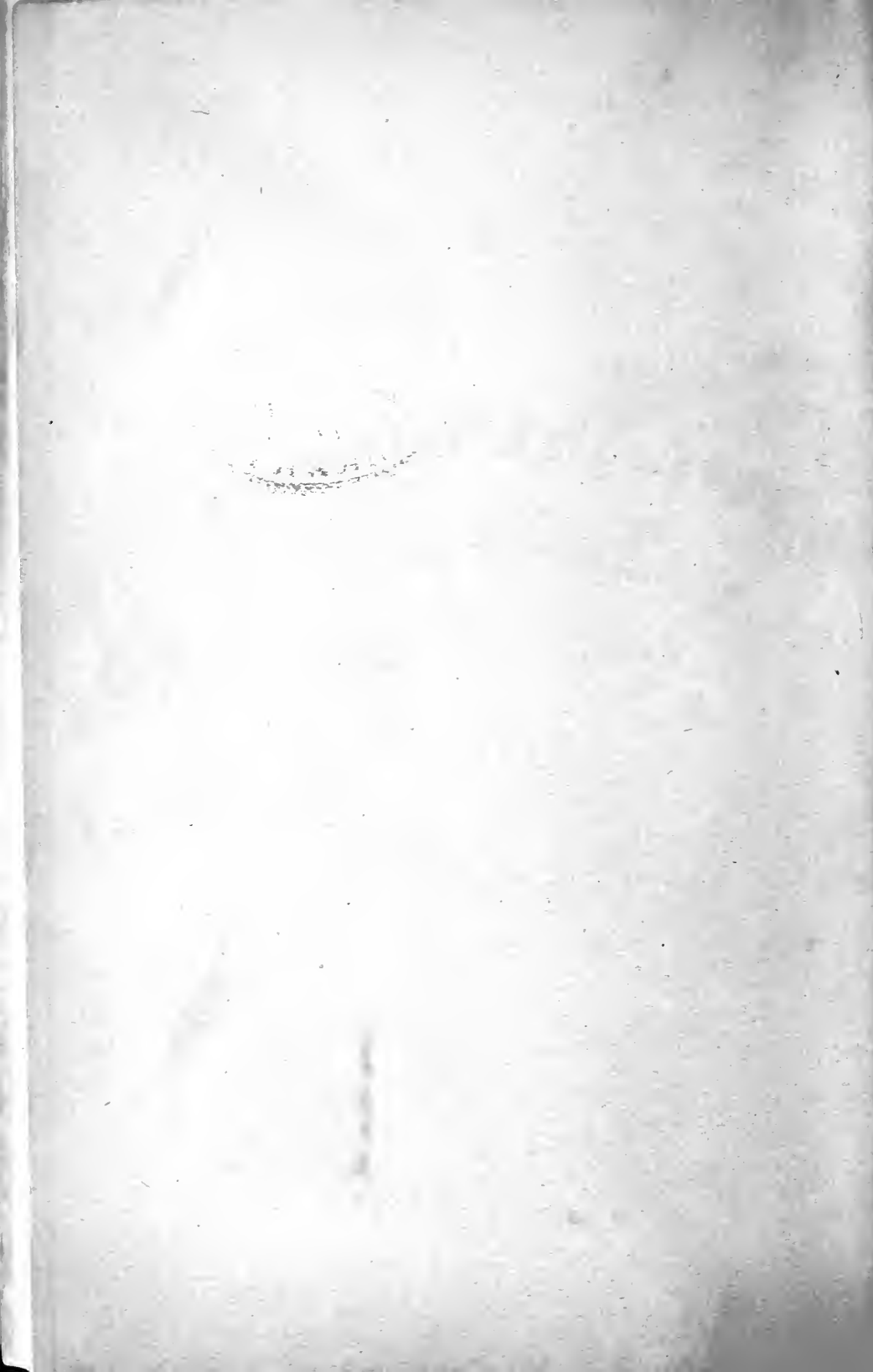
Summer Vacation begins on Friday, June 21, and ends on Monday, September 2, 1872, when the new Academic year begins.

Prize essays, Second Class, to be handed in before June 14.

Students examined for admission into the University from the 17th to the 19th of June, and on Friday and Saturday, the 30th and 31st of August.

University Sermon.—Sunday, June 16.





The Lehigh University.

"HOMO MINISTER ET INTERPRES NATURE."

THURSDAY, JUNE 22, 1871.

FOUNDED BY ASA PACKER.

UNIVERSITY DAY.

